Index No:_____

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

**SECONDARY EDUCATION CERTIFICATE LEVEL**

**MAY 2010 SESSION**

| | |
|---|---|
| SUBJECT: | **Computer Studies** |
| PAPER NUMBER: | I |
| DATE: | 3rd May 2010 |
| TIME: | 9:00 a.m. to 11:00 a.m. |

**MARKING SCHEME**

## Directions to Candidates

*Write your index number where indicated at the top of the page.*

*Answer **ALL** questions in the spaces provided. You are not allowed to use extra sheets other than those provided in this booklet.*

*Good English and orderly presentation are important.*

*The use of flowchart templates is permitted. The use of calculators is **NOT** permitted.*

| Question Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | **FOR MARKERS' USE** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| For Markers' use only | | | | | | | | | | | | | Total number of Marks or Grade obtained by candidate |
| **MARKS** | | | | | | | | | | | | | |

----------DO NOT WRITE IN THIS SPACE----------

1. What is the difference between each of the following pairs of items?

   a. Transposition errors and transcription errors

   ***A transcription error is a specific type of data entry error that is commonly made by human operators or by optical character recognition programs (OCR). Human transcription errors are commonly the result of typographical mistakes, putting fingers in the wrong place during data entry. Electronic transcription occurs when the results of a scan of printed matter is compromised or in an unusual font e.g. - if the paper is crumpled, or the ink is smudged when wet, the OCR may have a transcription error when reading.***

   ***1 mark should be awarded for the correct description of either human transcription or electronic transcription error.***

   ***Transposition errors occur when characters have "transposed" — that is, they have switched places. These types of errors are almost always human in origin.***

   b. Byte and word

   ***1 byte = 8 bits***

   ***1 word = number of bits CPU can process in one operation.***

   c. Compiler and assembler

   ***An Assembler converts Assembly instructions into executable machine language***

   ***whereas a compiler converts higher level programming language instructions into***

   ***executable machine language.***

   d. Integer and real data types

   ***An integer is a number which is whole whereas a real number is one which contains***

   ***a fractional part, i.e includes a decimal point.***

e. CAD and CAM

***The output from CAD(Computer Aided Design) is essentially a file describing how something is to be made. This maybe for example a picture or the track for a printed circuit board. The output from a CAD system maybe the input to CAM (Computer Aided Manufacture) system. CAM is the actual machine which cut and bend metal, shape plastics, spray paint etc.***

***Only 1 mark is awarded if the student gives the meaning of the acronym***

[10]

2. Give one reason why

a. Passwords are required

***To prevent unauthorized access, to provide security***

b. The Data Protection act was established

***To protect the privacy of individuals whose data is being stored***

c. Backups are made

***So that in the case that the original data becomes corrupted (unusable) a copy is always available***

d. Software is copyrighted

***To protect the software's developers rights of distribution. So that no parts of code are copied without the author's permission.***

[4]

3. Fill in the missing terms in the following statements
   a. The ALU performs arithmetic and ***logical*** operations.
   b. A character code that is widely used in computers is ***ASCII (UNICODE is to be accepted also)***
   c. Two types of optical storage media are ***compact disc*** and ***dvd***
   d. A computer's main memory stores both data and ***instructions***.
   e. A ***parity*** bit is an extra bit that is added to a byte to help detect errors.

[5]

4. a. Which communication medium transfers data as pulses of light? [1]

   ***Fiber optic***

   b. List another THEE types of communication media. [3]

   ***Coaxial cable, twisted pair cable and satellite links***

   c. Identify TWO advantages and TWO disadvantages of using a wireless network at home.

   ***+no cables or wiring is involved***

   ***+easy for more than one pc to use the same internet connection***

   ***-connection not as reliable as others since it is subject to interference or weak signals***

   ***-data may be viewed by others***

   ***-other people might use your internet connection***

[4]

5. a. My computer currently has 512Mb of main memory and I wish to upgrade it to 1Gb. If the memory chips available have a capacity of 256Mb, how many of these memory chips will I need to upgrade? [2]

   ***1Gb – 512Mb = 512Mb (1 mark)***

***512Mb/256Mb = 2 (1 mark)***

b. Mention TWO advantages of having a larger main memory. [2]

***System will be faster. More programs may be stored in memory thus may be run (apparently) simultaneously*.**

6. Describe a problem for which a computer simulation would be a suitable method of solution. Explain why a computer simulation would be the most suitable method in this case. [3]

***Flight Simulation (1 mark)***

***Since it would be too dangerous and expensive to carry out the task in reality (2 marks)***

7. a. Briefly describe TWO methods of validating data and for each method give an example of invalid data. [4]

**Method 1***:Range check : to reject any data items outside an expected range*

**Method 2***:Type check : to ensure that a data item is of a particular data type*

***Allow 2 marks for correct definitions and 2 marks for a valid example***

b. Distinguish between syntax, logical and runtime errors & give an example of each. [3]

**Syntax error** *: occur when program statements cannot be understood by the translator because they do not follow the rules laid down by the programming language ex. Missing semi colon at end of statement.*

**Logical error** ***: are mistakes in the design of the program such as an incorrect formula.***

**Run time error** ***: errors detected at run time while program is being executed. Ex division by zero***

***(1/2 mark for each description and ½ mark for each example)***

8. Mention THREE types of documentation which is produced during software development and state why it is needed. [6]

**1** ***Technical documentation: to help in understanding the program structure and how it was coded.***

**2** ***User manual: to aid application users in the running and use of the software package***

**3** ***Inline documentation: to aid programmers understand how program was written in case and amendments or extensions are needed***

***(1 mark for each type of documentation and 1 mark for its use)***

9. a. Write down the binary equivalent of the hexadecimal number 4A [2]

***01001010***

b. If the ASCII code equivalent to the letter A is $65_{10}$, which letter does the binary number in part (a) of this question represent? [2]

***J***

c. What is the largest number that can be stored in an 8 – bit register? [1

***255 or 11111111. (127 or 1111111 are also accepted)***

----------DO NOT WRITE IN THIS SPACE----------

10. Consider the terms below :

**Flash memory, Scanner, Mouse, Modem, RAM**

***a.*** Which of the above is a form of volatile storage?

***RAM***

b. Which of the above can translate drawings and photos into digital format?

***Scanner***

c. Which of the above allows digital data to be transmitted over telephone lines?

***Modem***

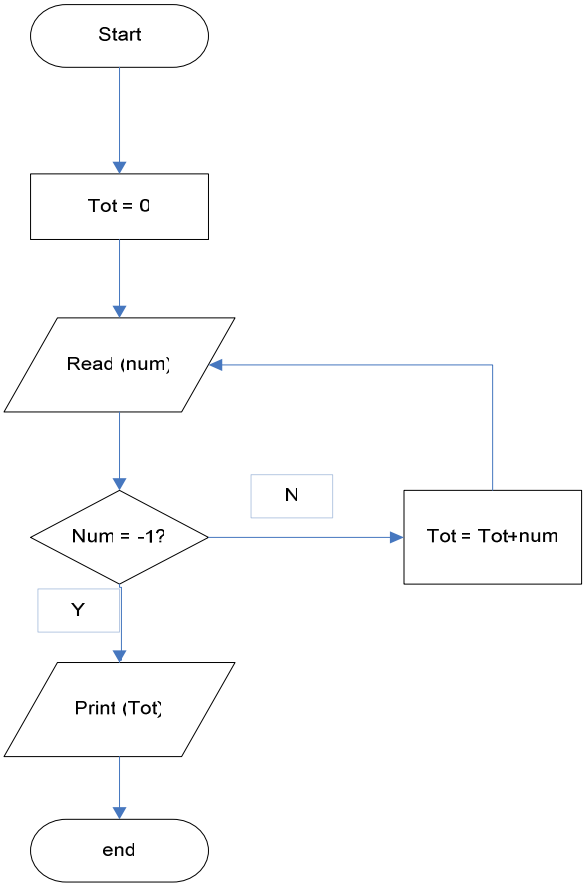
d. Which of the above is a form of non-volatile storage?

***Flash memory***

[8]

----------DO NOT WRITE IN THIS SPACE----------

11. Consider the flowchart below




a. If the above algorithm had to be implemented, what would the program do?

[3]

***The user is repeatedly asked to enter a number until -1 is inputted (1 mark). The total of the numbers entered is calculated (1 mark) and then displayed on screen (1 mark).***

b. Implement the above algorithm in Pascal. [9]

```
Program Exam;
Var
    Num, I,total : integer;
```

```
Begin
    Total := 0;
    Num:=0;
    while (num<>-1) do
    begin
        Writeln('Enter a number');
        Readln(num);
        Total := total+num;
    End;
    Writeln('the total of the numbers is ',total);
End.
```

*Correct program structure 1 mark*

*Correct syntax 1 mark*

*Correct declaration of variables 1 mark*

*Correct initialization of variables 1 mark*

*Correct use of loop 2 marks*

*Correct use of display and input commands 2 marks*

*Correct summation formula 1 mark*

c. Write code to :

i. Declare an array of TEN integers.

ii. Fill the array with data entered by the user.

[4]

```
(i) a =  array [1..10] of integer
(ii) for  i = 1 to 10 do
        readln( a[i]);
```

*Correct declaration 2 marks*

*Correct use of loop 1 mark*

*Correct input  statement 1 mark*

----------DO NOT WRITE IN THIS SPACE----------

12. Consider the truth table below

| A | B | C | X | Y | Z |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 0 |

Draw the logic circuit corresponding to this truth table. [9]

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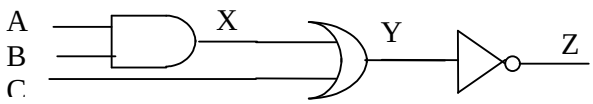
***This question had a minor mistake. The red 0 in the table had to be a 1. In any case after going through some scripts we have come up to this conclusion in marking:***

- ***If the figure below was drawn give full marks (9)***




- ***If the complete AND gate was drawn give full marks***
- ***If a note is written that there's an error but nothing else is done give a 5.***